**Expert Pack:** Real Zombies in Real Life?!

Submitted by: Providence Public Schools< RI

Grades: 5-6 Date: May 2015

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| **Topic/Subject**  How do the behaviors of certain living things help them survive throughout their life cycle? |

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| **Texts/Resources**  Books   1. *Parasites: Organisms that Feed on Living Things* 2. *Zombie Makers*   Articles   1. “Biography of Judy Sakanari” 2. “Fungus Creates Zombie Ant Army to Reproduce” 3. “Guinea Worm Eradication Program” 4. “Zombie Bees Surface in the Northeast” 5. “Zombie Creatures: What Happens When Animals are Possessed by a Parasitic Puppet Master?”   Videos   1. “Body Invaders” [Animated, narrated video] 2. “One of Most Complicated Lifecycles: Extreme Parasite Controlling the Ant’s Brain” [Animated, narrated and infographic video] 3. “Parasite Tales: The Jewel Wasp's Zombie Slave” with Carl Zimmer [Ted Talk Youth Video] 4. “Snail Zombies” [Animated, narrated video]   Other Media   1. “Paratasized Ants Get Berry Sick” [Podcast and accompanying text] 2. “The Life Cycle of the Guinea Worm Disease” [Infographic] 3. “Zombie Creatures: What Happens When Animals are Possessed by a Parasitic Puppet Master?” [Slideshow, captions] 4. “ZomBee Infection Map” [Interactive map]   Each expert pack contains a variety of selections grouped to create as coherent and gradual a learning process for students as possible, generally beginning with lower levels as measured by quantitative and qualitative measures, and moving to more complex levels in the latter selections. This gradated approach helps support students’ ability to read the next selection and to become ‘experts’ on the topic they are reading about.  *Refer to annotated bibliography on the following pages for the suggested sequence of reading*. |
| **Rationale and suggested sequence for reading:**  Throughout this Text Set, students will build their understanding of various traits of parasites such as how they survive, how they impact their hosts, how scientists study them and more. The texts are sequenced to support students in developing their understanding about this topic to answer the key question, “How do the behaviors of certain living things help them survive throughout their life cycle?” (Students could create a graphic organizer.)  It is recommended that the launch of this expert pack occur as a whole class discussion to support students in dispelling the myth of human zombies and beginning to consider other types of zombies that may exist in the animal world. For this whole class expert pack launch, students will read the Introduction of *Zombie Makers* (pages 4-5)to access background knowledge about zombies in movies and video games and discuss whether or not zombies are real. Immediately following this text, students will watch a video, “One of Most Complicated Lifecycles: Extreme Parasite Controlling the Ant’s Brain,” which depicts the life cycle of a parasite who turns one of its hosts into a zombie. Additionally, they will begin to be exposed to the scientific terminology related to this subject.  Following the whole class introduction, students should set out on their own to further explore the rest of the *Zombie Makers* book to get an overview of the variety of parasites described in the text. The next text students will study is the book *Parasite.* In this text, students will have the opportunity to gain a clearer understanding of the scientific terms “parasite” and “host,” along with many other aspects of the world of parasites. Students will then read the online article, “Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master?” and view its accompanying slide show. These two sources provide further exposure to a range of illustrations and descriptions of different types of parasites and their zombified hosts.  Most of the remaining texts and multimedia in this set are sequenced to provide a closer look at specific creatures who exhibit the “Zombie Traits” introduced in the book *Zombie Makers*. The texts will be read or viewed in a series from “Zombie trait #1” through “Zombie trait #5*.”* The rationale of this sequencing is for teacher use only. To maximize opportunities for inquiry and discovery, students should not be explicitly told about the intentionality of this sequence. The texts relating to each “Zombie Trait”\* are listed in order below:   * Zombie trait #1 - The host moves slowly and mechanically and behaves oddly (*Zombie Makers* pp. 6-13)   + Article - “’Zombie Bees Surface in the Northeast”   + Interactive Map - ZomBee Infection Map * Zombie trait #2 – The host obeys commands without question (*Zombie Makers* pp. 14-21)   + Article - “Fungus Creates Zombie Ant Army to Reproduce”   + Infographic – “The Life Cycle of the Guinea Worm Disease”   + Article – “Guinea Worm Eradication Program” * Zombie trait #3 – The host as a babysitter or bodyguard (*Zombie Makers* pp. 22-29)   + Video- “Body Invaders” * Zombie trait #5 - Hosts are tricked “into becoming infected so they will spread the zombifying factor” (*Zombie Makers* pp. 34-41)   + Video - “Snail Zombies”   + Podcast and text – “Paratasized Ants Get Berry Sick”   The final texts in the set are not about zombie traits, but provide information about a scientist who studies parasites. First, students will read a biography about a parasitologist. This text was included to help students understand that studying parasites is a career and tells how parasitologist, Judy Sakanari, became interested in the field. (There is also a section about the field of parasitology in the *Parasites* book used early on in the set.) The last item in this Text Set is a Ted Talk Youth video, “Parasite Tales: The Jewel Wasp's Zombie Slave,” featuringscientist Carl Zimmer, talking about his favorite parasite. Students will likely see the connection between his favorite parasite and one of the zombifying factors covered earlier in the set.  Special notes:   * **This may be a potentially scary or difficult topic for some students. It is recommended that teachers preview all texts and videos in their entirety to consider individual student’s potential sensitivity to the content and images prior to the launch of this Text Set.** * \**Zombie Makers* “Zombie Trait #4”(pages 30-33), discusses microscopic parasites called viruses. The concept of viruses was intentionally not presented as an in-depth topic throughout the Text Set. |
| **The Common Core Shifts for ELA/Literacy:**   1. Regular practice with complex text and its academic language 2. Reading, writing and speaking grounded in evidence from text, both literary and informational 3. *Building knowledge through content-rich nonfiction*   Though use of these expert packs will enhance student proficiency with most or all of the Common Core Standards, they focus primarily on Shift 3, and the highlighted portions of the standards below. |
| **College and Career Readiness Anchor Standards for Reading Literary and/or Informational Texts** *(the darkened sections of the standards are the focus of the Expert Pack learning for students)***:**   1. ***Read closely to determine what the text says explicitly and to make logical inferences from it*;** cite specific textual evidence when writing or speaking to support conclusions drawn from the text. 2. ***Determine central ideas or themes of a text*** *and analyze their development*; summarize the key supporting details and ideas. 3. **Read** **and comprehend complex literary and informational texts independently and proficiently** |

**Annotated Bibliography**

and suggested sequence for reading

**800L *Zombie Makers: True Stories of Nature’s Undead***

Author: Rebecca L. Johnson

Genre: Informational book; contains section headings, captions, author’s note, glossary, bibliography, index and suggestions for more resources to explore.

Length: 48 pages

Synopsis: Provides scientific details and examples about host-parasite relationships; most specifically those relationships where the parasite controls the host in one way or another to ensure the survival of its species. Many photographs and captions are included throughout the text.

Citation: Johnson, R.L. (2013). *Zombie makers: True stories of nature’s undead.* Minneapolis, MN: Millbrook Press.

Cost/Access: $23 for hardcover, $22 for ebook, $46 for multi-user ebook

Recommended Student Activities: Have students discuss the portrayal of zombies in the Introduction. Are they real or not? (Make sure this hook/introduction leaves kids with a clear understanding that human zombies are fictional.) Then, complete A Picture of Knowledge activity.

**N/A “One of Most Complicated Lifecycles: Extreme Parasite Controlling the Ant’s Brain”**

Author: Unknown

Genre: Informational video; includes graphics, animation and narration.

Length: 2:43 minutes

Synopsis: This video teaches about the life cycle of a parasite starting with its selection of an ant host who is controlled by a parasite. The parasite moves through its life cycle going to a different type of host at each new phase of life. Most of these hosts do not end up becoming controlled or “zombified” by the parasite. At the end, a new generation of parasites returns to the ants to repeat a new lifecycle.

Citation: One of most complicated lifecycles: Extreme parasite controlling the ant’s brain [Video file]. (n.d.). Retrieved February 4, 2015, from <https://www.youtube.com/watch?v=4PB4SjX8QkA>

Cost/Access: $0.00 <https://www.youtube.com/watch?v=4PB4SjX8QkA>

Recommended Student Activities: Continue with the whole class introduction by viewing this video together. Then Complete A Picture of Knowledge activity and discuss, “Are zombies real or not? What evidence does this video provide?”; Begin Rolling Knowledge Journal.

**790L *Parasites: Organisms that Feed on Living Things***

Author: Megan Kopp

Genre: Informational book; contains table of contents, photos, captions, infographics, headings, maps, quick quiz, glossary and index; provides web link and code to access numerous interactive resources such as: Videos, interactive worksheets, webpages and audio text.

Length: 24 pages

Synopsis: This book explains the food chain and how it relates to parasites. The book begins with a detailed description of what parasites are, examples of parasites, where they can be found and how they interact with the environment and their hosts.

Citation: Kopp, M. (2012). *Parasites: Organisms that feed on living things.* New York, NY: AV2 by Weigl.

Cost/Access: $9 paperback, $27 for ebook

Recommended Student Activities: Pop Quiz.

**1280L “Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master?”**

Author: Katherine Harmon

Genre: Informational article

Length: 1,005 words

Synopsis: This article, which serves as an anchor to the following slide show, explains how an organism can appear to be possessed. Though still a mystery, it is believed that some type of chemical is released by parasites which in turn cause animals to act as if they are possessed. The notion of humans being immune or not immune to parasitic possession is also explored. The article concludes with a question remaining in the scientific world; “How can a member of one kingdom modify the behavior of another kingdom?”

Citation: Harmon, K. (2009, October 30). Zombie creatures: What happens when animals are possessed by a parasitic puppet master?. *Scientificamerican.com.* <http://www.scientificamerican.com/article/zombie-creatures-parasites/>

Cost/Access: $0.00 <http://www.scientificamerican.com/article/zombie-creatures-parasites/>

Recommended Student Activities: A Picture of Knowledge.

**1400L “Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master?” [Slideshow]**

Author: Scientific American

Genre: Informational slideshow; contains photos and captions

Length: 832 words

Synopsis: This slideshow is related to the article, “Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master?” It provides photos and captions to show how five different parasites affect their hosts.

Citation: Scientific American. (n.d.). What happens when animals are possessed by a parasitic puppet master? [Slideshow]. Retrieved March 15, 2015, from: <http://www.scientificamerican.com/slideshow/zombie-creatures-parasites/>

Cost/Access: $0.00 <http://www.scientificamerican.com/slideshow/zombie-creatures-parasites/>

Recommended Student Activities: A Picture of Knowledge.

**1510L “‘Zombie’ Bees Surface in the Northeast”**

Author: Ben Gittleson

Genre: Informational article; contains photos and captions

Length: 551 words

Synopsis: This article is about a parasite that has infected honeybees. The author provides information about the regions in the United States where this parasite is typically found and how there has been a new discovery of the parasite in Vermont. He also describes how the parasite affects the bees and the reaction of beekeepers and scientists to this new discovery in Vermont. The article ends with speculation about how scientists will proceed in studying and discovering the spread of this parasite into the Northeast region of the Unites States.

Citation: Gittleson, B. (2014, January 30). ‘Zombie’ bees surface in the northeast. *abcnews.go.com*. Retrieved from <http://abcnews.go.com/Technology/zombie-bees-found-northeast/story?id=22290433>

Cost/Access: $0.00 <http://abcnews.go.com/Technology/zombie-bees-found-northeast/story?id=22290433>

Recommended Student Activities: The Survival of a Parasite Graphic Organizer; Parasite Features Analysis.

**N/A “ZomBee Infection Map”**

Author: ZomBee Watch (A citizen scientist project tracking the honeybee parasite *Apocephalus borealis.)*

Genre: Interactive map, map key, map or satellite view; tabs linking to more information about the ZomBee citizen scientist project such as a slideshow, video tutorials, life cycle infographic, scientists’ biographies and hyperlinked FAQ.

Length: N/A

Synopsis: This interactive map shows updated data in reference to the location of the parasitic fly mentioned in the article “‘Zombie’ Bees Surface in the Northeast” to determine where the zombie flies have recently been found to be infecting honeybees. The markings on the map indicate locations in the United States where “citizen scientists” have submitted samples of potentially infected honeybees. The key shows three categories: Samples that have been deemed infected, samples still being processed and samples that have not been deemed as infected.

Citation: *ZomBee infection map.* (n.d.). Retrieved March 15, 2015, from <https://www.zombeewatch.org/map/public#.VP-su3zF91Y>

Cost/Access: $0.00 <https://www.zombeewatch.org/map/public#.VP-su3zF91Y>

Recommended Student Activities: Wonderings.

**1270L “Fungus Creates Zombie Ant Army to Reproduce”**

Author: Samantha Ellis

Genre: Informational article; photo with caption

Length: 670 words

Synopsis: This article is about four new species of fungus which infect ants. The so-called zombie or brain-manipulating fungus alters the behavior of the ant host, causing it to die. The fungus reproduces by taking over these insects. The article concludes that these zombie-like behaviors will not likely end with mass armies of ants.

Citation: Ellis, S. (2011, March 30). Fungus creates zombie ant army to reproduce. *globalanimal.org*. Retrieved from <http://www.globalanimal.org/2011/03/30/fungus-creates-zombie-ant-army-to-reproduce/31641/>

Cost/Access: $0.00 <http://www.globalanimal.org/2011/03/30/fungus-creates-zombie-ant-army-to-reproduce/31641/>

Recommended Student Activities: The Survival of a Parasite Graphic Organizer.

**N/A “The Life Cycle of the Guinea Worm Disease”**

Author: The Carter Center/AL Granberg

Genre: Infographic

Length: N/A

Synopsis: This infographic depicts the life cycle of the parasite known as the Guinea Worm.

Citation: The Carter Center/Al Granberg (Graphic). (2015). The life cycle of the Guinea Worm Disease [Infographic], retrieved March 15, 2015 from

<http://www.cartercenter.org/resources/images/health/guinea_worm/GW-life-cycle-8-09.JPG>

Cost/Access: $0.00 <http://www.cartercenter.org/resources/images/health/guinea_worm/GW-life-cycle-8-09.JPG>

Recommended Student Activities: A Picture of Knowledge.

**1430L “Guinea Worm Eradication Program”**

Author: The Carter Center

Genre: Informational webpage

Length: 797 words

Synopsis: This webpage gives an overview of Guinea Worm and the eradication efforts being made globally. The page also contains numerous links to other sources such as: Infographics, timelines, videos, photo galleries and newsletters.

Citation: The Carter Center. (2015). Guinea Worm Eradication Program. www.cartercenter.org. Retrieved from <http://www.cartercenter.org/health/guinea_worm/index.html>

Cost/Access: $0.00 <http://www.cartercenter.org/health/guinea_worm/index.html>

Recommended Student Activities: The Survival of a Parasite Graphic Organizer; Parasite Features Analysis.

**N/A “Body Invaders”**

Author: National Geographic TV

Genre: Informational video

Length: 4:43 minutes

Synopsis: This video depicts a parasite-host relationship where a caterpillar provides nourishment and protection to wasps throughout a portion of their life cycle. \* May contain sensitive material for some viewers.

Citation: Body invaders [Video file]. (n.d.). Retrieved February 4, 2015, from <https://www.youtube.com/watch?v=vMG-LWyNcAs&x-yt-ts=1421914688&x-yt-cl=84503534>

Cost/Access: $0.00

<https://www.youtube.com/watch?v=vMG-LWyNcAs&x-yt-ts=1421914688&x-yt-cl=84503534>

Recommended Student Activities: A Picture of Knowledge.

**N/A “Snail Zombies”**

Author: National Geographic

Genre: Informational video

Length: 1:54 minutes

Synopsis: This video shows microscopic worms’ journey from snail host to bird host and back to snail. Although the birds are not impacted by the parasite, the worms control the snail’s mind in order to put itself in the perfect place to be eaten by the birds.

Citation: Snail zombies [Video file]. (n.d.) Retrieved February 4, 2015, from <https://www.youtube.com/watch?v=fkiL-v4X8w8>

Cost/Access: $0.00 <https://www.youtube.com/watch?v=fkiL-v4X8w8>

Recommended Student Activities: Fact or Fib Game.

**1000L “Paratasized Ants Get Berry Sick”**

Author: Cynthia Graber

Genre: Informational Podcast

Length: 1:14 minutes/224 words

Synopsis: This podcast describes a parasite, known as the nematode, that causes ants’ abdomens to turn red and look like berries. The ants from the colony with the berry-like abdomens attract birds to eat them. Once digested, the parasite falls back to the ground in the bird droppings. The ants forage through the droppings for seeds and the nematode species continues its life cycle by infecting new ants.

Citation: Graber, C. (Reporter). (2008, February 5). *Paratasized ants get berry sick* [Audio/text podcast]. Retrieved from <http://www.scientificamerican.com/podcast/episode/e6cf0fa2-051b-d169-c8898c7a371dcb6b/>

Cost/Access: $0.00 <http://www.scientificamerican.com/podcast/episode/e6cf0fa2-051b-d169-c8898c7a371dcb6b/>

Recommended Student Activities: The video found at the following link can provide students access to an image of the ants that have been infected by the parasitic nematode. This video does not contain any (picky, but there are some jungle sounds) text: <http://www.berkeley.edu/news/media/releases/2008/01/ants-vid.shtml>

**1040L “Biography of Judy Sakanari”**

Author: Mary Knudson

Genre: Informational article; photo with caption

Length: 395 words

Synopsis: This biography describes how parasitologist, Judy Sakanari, became interested in parasites as a curious, young girl. She grew up to be a scientist who now spends her time researching parasites and their relationships with their hosts.

Citation: Knudson, M. (n.d.). Biography of Judy Sakanari. *Wonderwise.unl.edu.* Retrieved February 4, 2015, from <http://wonderwise.unl.edu/12parasi/parascie.htm>

Cost/Access: $0.00 <http://wonderwise.unl.edu/12parasi/parascie.htm>

Recommended Student Activities: This can be paired with the excerpt about parasitologists on page 19 in *Parasite*; Pop Quiz (refer to *Learning Worth Remembering* for questions and answers.)

**NA “Parasite Tales: The Jewel Wasp's Zombie Slave”**

Author: Ted Talk Youth

Genre: Informational video lecture

Length: 7:12 minutes

Synopsis: This Ted Talk by Carl Zimmer, a popular science writer and blogger, (especially regarding the study of evolution and parasites), talks to a group of students about how the Jewel Wasp and the cockroach have both a disgusting and fascinating parasitic relationship. The Jewel Wasp stings the cockroach, and months later, a Jewel Wasp hatches out of the cockroach. At TEDYouth 2012, Carl Zimmer walks us through how this happens and why it interests him.

Citation: Carl Zimmer (Speaker) & TED Youth (producer). (2012). *Parasite tales: The Jewel Wasp's zombie slave* [video file]. Retrieved from <http://ed.ted.com/lessons/parasite-tales-the-jewel-wasp-s-zombie-slave-carl-zimmer>

Cost/Access: $0.00 <http://ed.ted.com/lessons/parasite-tales-the-jewel-wasp-s-zombie-slave-carl-zimmer>

Recommended Student Activities: The Survival of a Parasite Graphic Organizer; Parasite Feature Analysis; Culminating Activity.

Supports for Struggling Students

By design, the **gradation of complexity** within each Expert Pack is a technique that provides struggling readers the opportunity to read more complex texts. Listed below are other measures of support that can be used when necessary.

* Provide a brief **student-friendly glossary** of some of the academic vocabulary (tier 2) and domain vocabulary (tier 3) essential to understanding the text
* Download the Wordsmyth widget to classroom computers/tablets for students to access student-friendly definitions for unknown words. <http://www.wordsmyth.net/?mode=widget>
* Provide brief **student friendly explanations** of necessary background knowledge
* Include **pictures or videos** related to the topic within and in addition to the set of resources in the pack
* Select a small number of texts to **read aloud** with some discussion about vocabulary work and background knowledge
* Provide **audio recordings** of the texts being read by a strong reader (teacher, parent, etc.)
* **Chunk the text** and provide brief questions for each chunk of text to be answered *before* students go on to the next chunk of text
* Pre-reading activities that focus on the **structure and graphic elements** of the text
* Provide **volunteer helpers** from the school community during independent reading time.

**Text Complexity Guide**

“Zombie Creatures: What Happens When Animals are Possessed by a Parasitic Puppet Master?”

by Katherine Harmon

1. **Quantitative Measure**

Go to <http://www.lexile.com/> and enter the title of the text in the Quick Book Search in the upper right of home page. Most texts will have a Lexile measure in this database. You can also copy and paste a selection of text using the Lexile Analyzer.

2-3 band 420 -820L

4-5 band 740 -1010L

6-8 band 925 - 1185L

9 -10 band 1050 – 1335L

11 – CCR 1185 - 1385

1400L

1. **Qualitative Features**

Consider the four dimensions of text complexity below. For each dimension\*, note specific examples from the text that make it more or less complex.

The purpose of this article is to highlight the often mysterious behavior of parasites and how they change the behavior of other animals against their will. It also talks about how parasites are not only internally controlling other animals, but externally as well. Scientists are going beyond describing the behavior of these parasites and are looking at *how* parasites are changing behavior.

The structure is nicely organized with the use of subheadingsand a variety of graphic sources to aid in comprehension. It includes pictures and a slide show of zombie animals. It provides photos and captions to show how five different parasites affect their hosts.

Some of the sentences are long and complex, containing dependent clauses and transition words. Vocabulary is very complex (Examples: uncharacteristic, destined, evolutionary, insidiously) and may be unfamiliar to students.

The subject matter should be somewhat familiar to students reading the expert pack. Students will already have an understanding of the terms *parasite* and *host* along with a beginning understanding of the relationship between the two, if the texts are read in the suggested order. This text introduces parasite *manipulation* of the host as a new concept.

**Meaning/Purpose**

**Structure**

**Language**

**Knowledge Demands**

1. **Reader and Task Considerations**

*What will challenge students most in this text? What supports can be provided?*

* Rereading, chunking, and discussion could support students with sentence length and complex vocabulary.
* Annotating and/or coding strategies can help students unpack meaning.
* Use of a graphic organizer to take notes on the topic.
* Encouraging students to make connections to other texts in the set could support and enhance understanding.

**Expert Pack:** Real Zombies in Real Life?!

Submitted by: Providence Public Schools, RI

Grade: 5-6 Date: May 2015

**Learning Worth Remembering**

**Cumulative Activities** – The following activities should be completed and updated after reading each resource in the set. The purpose of these activities is to capture knowledge building from one resource to the next, and to provide a holistic snapshot of central ideas of the content covered in the expert pack. *It is recommended that students are* ***required*** *to complete one of the Cumulative Activities (Rolling Knowledge Journal or Rolling Vocabulary) for this Expert Pack.*

1. **Rolling Knowledge Journal**
2. Read each selection in the set, one at a time.
3. After you read *each* resource, stop and think what the big learning was. What did you learn that was new *and important* about the topic from *this* resource? Write, draw, or list what you learned from the text about (topic).
4. Then write, draw, or list how this new resource added to what you learned from the last resource(s).

**Sample Student Response**

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| **Title** | **Write, Draw, or List** | **Write, Draw, or List** |
|  | **New and important learning about the topic** | **How does this resource add to what I learned already?** |
| 1. *Zombie Makers: True Stories of Nature’s Undead* | There are *things* that can take over the bodies and brains of innocent creatures turning them into slaves. |  |
| 1. “One of Most Complicated Lifecycles: Extreme Parasite Controlling the Ant’s Brain” | Parasites can go through many phases of development before their cycles begin again. | Zombie-making parasites possess many traits that will greatly improve the odds that their offspring will carry on. |
| 1. *Parasites: Organisms that Feed on Living Things* | Food provides the energy that plants and animals need to grow and thrive. | Consuming food isn’t enough to help a parasite survive. They also need to live on or in a plant or animal. |
| 1. “Zombie Creatures: What Happens When Animals are Possessed by a Parasitic Puppet Master?” | Researchers believe some sort of chemical is involved in how parasites are able to possess animals. | Some parasites control an animal's behavior from within the animals and some control an animal's behavior from outside its body. |
| 1. “Zombie Creatures: What Happens When Animals are Possessed by a Parasitic Puppet Master?” [Slideshow] | A parasite that lives to change mouse behavior may also be affecting the way humans act. | There is some evidence that though humans aren’t turning into zombies, they may be affected by parasites. |
| 1. “‘Zombie Bees Surface in the Northeast” | A fly is infecting honeybees by laying eggs in the bees and turning the bees into zombies. The parasites use the bees as a host and then the bees drop dead after the eggs hatch. | Insects can be infected by parasites. Parasites can easily spread from one geographic area to another. |
| 1. “ZomBee Infection Map” | Citizen scientists are interested in understanding why bees in their area are dying. There’s a map to show what scientists have found out about all of the samples people have collected. | Official scientists and amateur scientists are interested in learning more about parasites and how they might spread around to other geographic areas. |
| 1. “Fungus Creates Zombie Ant Army to Reproduce” | Four new types of fungus reproduce by taking over the brains of ants. Ants become infected and eventually die after coming in contact with spores released by the fungus. | Certain species of fungi are parasitic and can control animal/insect behaviors. |
| 1. “The Life Cycle of the Guinea Worm Disease” | The Guinea Worm causes the host to feel uncomfortable and the only way to relieve the pain is by entering the water. Contact with the water causes the worm to burst, releasing larvae into the water. Water fleas ingest the larvae and humans then drink the water. The larvae travel to the intestine of the human and grow into worms. The life cycle continues. | How the life cycle of a parasite can impact human life. |
| 1. “Guinea Worm Eradication Program” | Traditional method for wiping out the disease just allowed the life cycle of the parasite to continue. The Carter Center is teaching people to filter all drinking water and preventing transmission by keeping anyone with an emerging worm out of the water. They are working to stop the life cycle of the worm. | Some parasites are extremely harmful for human hosts so people are working to eradicate them. |
| 1. “Body Invaders” | Wasps use a caterpillar's body as a surrogate womb. They get the ‘zombie’ caterpillar to make a cocoon around the larvae and then protect the cocoon until it is time for the wasp to hatch. The caterpillar dies from starvation. | Parasitized insects act as a mother as well as a bodyguard for the wasp. |
| 1. “Snail Zombies” | Worms infest a snail’s eyestalks. This entices birds to eat the snail. A bird digests the parasite, and then eliminates the larvae that grew inside the bird through poop. Then the whole cycle starts again when the snail eats the bird poop. | Some hosts are tricked into becoming infected so they will spread the zombifying factor. |
| 1. “Paratasized Ants Get Berry Sick” | A parasite makes an ant’s abdomens look like the berries in the forest to get birds to eat the ant. After the birds eat the ants, the parasite comes back out in the bird’s poop. The poop falls to the ground and other ants eat it, starting the parasites life cycle all over again. | Many parasites need to travel through different hosts and vectors to survive throughout their life cycle. |
| 1. “Biography of Judy Sakanari” | Scientists who study parasites are called parasitologists. Things that interest you as a young child might help you decide your future career. | Parasitologists as well as amateur scientists can learn about parasites from studying them closely. |
| 1. “Parasite Tales: The Jewel Wasp's Zombie Slave” | The science behind the sting of the wasp relates to Pharmacology. Scientists use a drug called “Ivermectin” to treat River Blindness. This drug paralyzes the parasite that caused the disease much like the sting of the wasp. | Scientists use information learned from studying parasites to develop new medicines to help people. |

1. **Rolling Vocabulary: “Sensational Six”**

* Read each resource then determine the 6 words from each text that most exemplify the central idea of the text.
* Next use your 6 words to write about the most important idea of the text. You should have as many sentences as you do words.
* Continue this activity with EACH selection in the Expert Pack.
* After reading all the selections in the Expert Pack, go back and review your words.
* Now select the “Sensational Six” words from ALL the word lists.
* Use the “Sensational Six” words to summarize the most important learning from this Expert Pack.

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| **Title** | **Six Vocabulary Words & Sentences** |
| *Zombie Makers: True Stories of Nature’s Undead* | **parasites, hosts, fungus, zombies, reproduce, spores**    **Parasites** invade the bodies of other living things.  Those living things become the parasites’ **hosts.**  When a **fungus** invades, it releases chemicals into the brains of normal living things.  Living things are turned into **zombies** or creatures that will do whatever the fungus commands.  The fungus uses living things for food and digests it. It gets energy it needs to grow and **reproduce.**  The life cycle continues as the **spores** infect other living things. |
| “One of Most Complicated  Lifecycles: Extreme Parasite Controlling the Ant’s Brain” | **lodged, paralyzed, digestive system, liver fluke, cavity, mucus**  A parasite becomes **lodged** into an ant’s brain.  The ant becomes **paralyzed** by the parasite and climbs to the top of a leaf.  When the ant gets eaten by a rabbit, the parasite travels through the **Digestive System** and into the liver.  A parasitic flatworm called the **liver fluke** produces thousands of eggs and feeds on blood.  When the egg hatches, it moves into the breathing **cavity** of a snail.  Eventually there is so much **mucus** that the snail has to cough up a slime ball which becomes food for other ants so the cycle can continue. |
| *Parasites: Organisms that Feed on Living Things* | **food chain, producers, consumers, parasite, host, vector**    The **food chain** is made up of producers and consumers.  **Producers** provide the energy that other living things need to grow.  **Consumers** get the energy they need from producers.  There is a special type of consumer called a **parasite**that feeds from a host. The word **parasite**comes from a similar word, used in ancient Greece.  Parasites get energy and shelter from a **host**.  A **vector**is a carrier such as a tick or fleas that transmit parasites from one organism to another. |
| “Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master?” | **will, possessed, commanding, chemical, manipulation, adapting**  Parasites can change the behavior of an animal or an insect against its **will**.  A spider, seemingly **possessed**, spins an uncharacteristic web-just before wasp larvae nesting on its abdomen suck the last nourishing juices from the spider’s dying body and make a cocoon in the weird web.  The mechanisms by which these parasites are **commanding** their hosts remain, by in large, unsolved mysteries.  Scientists believe that the parasites use some type of **chemical** to manipulate the host.  Even people may not be fully immune to such **manipulation**.  Some hosts are **adapting** so that they can survive despite being affected by a parasite. |
| “Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master?” [Slideshow] | **chemical, tainted, metabolized, spores, neurotoxin, paralyze**    The **chemical** changes brought on by the parasite appear to have some of the same effects on humans, who can be infected by ingesting parasite eggs from cat feces.  After the bird digests its **tainted** treat, it passes along the parasite passenger in its droppings, which stand waiting to infect other unsuspecting ants.  The ant then dies as its innards are **metabolized** by the fungus inside.  Eventually, the invader sprouts from the ant’s body and releases **spores** that drift to the ground, creating a silent circle of certain death for any other ant that passes through it.  The wasp injects a **neurotoxin** into the cockroach’s brain.  This toxin kills off the roach’s ability to control its own movement but doesn’t **paralyze** it entirely. |
| “‘Zombie’ Bees Surface in the Northeast” | **mutant, infest, erratic, disoriented, hosts, agriculture**  A **mutant** bee flies around in an abnormal or strange way.  Most bee **infestations** have been on the West Coast, but they might be spreading to the East.  The bees’ behavior once infected is very **erratic** and similar to “zombie” behavior.  The bees are **disoriented** and don’t really know what they are doing.  This effect starts with a fly that lays eggs in the bees and the bees become a **host** for the fly’s eggs to hatch.  Farmers need bees to pollinate **agriculture** fields and produce honey. |
| “ZomBee Infection Map” | **citizen scientists, infected, ZomBee Watch, samples, distribution, sampling**  **Citizen scientists** are trying to help study the spread of Zombie Fly across the U.S.  When honey bees are **infected** by the Zombie Fly they act strangely and die.  Citizen scientists are tracking a honey bee parasite through a project called **ZomBee Watch**.  Honey bee **samples** are tested to find out whether or not they have been sickened by the Zombie Fly.  The **distribution** of red marks on the map show that most of the bees found to be infected by the Zombie Fly are found on the West Coast of the United States.  They yellow marks on the map show places where samples have been submitted, but **sampling** is still in progress, so they don’t yet know if they bees have been infected by the Zombie Fly. |
| “Fungus Creates Zombie Ant Army to Reproduce” | **fungus, spores, alters, reproduce, unsuspecting, army**  Four new types of **fungus** turn ants into zombies.  Ants become infected when they come in contact with **spores** released by the fungus.  The fungus **alters** the behavior of the ant causing it to die.  After the ant dies, the fungus releases spores into the air to **reproduce**.  These spores rain onto **unsuspecting** ants.  It is unlikely that the fungi would turn ants into a zombie **army**. |
| “Guinea Worm Eradication Program” | **incapacitates, eradicate, extracting, lesions, community-based interventions, vaccine**  Guinea Worm is a disease that **incapacitates** people for long periods of time and prevents them from living their lives.  The Carter Center is working to **eradicate** this disease.  Traditional treatment consisted of **extracting** the worm from the infected.  The **lesions** would often develop other infections because of this.  Organizations are using **community-based interventions** to educate and change behavior.  Incidences of the disease have been reduced without the use of a **vaccine** or medicine. |
| “The Life Cycle of the Guinea Worm Disease” | **Guinea Worm Disease, relief, larvae, water fleas, blister, life cycle**  The **Guinea Worm Disease** begins with an exposed worm.  The infected person seeks **relief**from the pain by entering the water.  On contact with the water, the worm bursts and releases thousands of **larvae** into the water.  Tiny **water fleas** ingest the larvae and people then drink the water.  The fertilized worm continues to grow in the human for one year and then forms a painful **blister** on the skin.  The **life cycle** begins again and continues just like a circle. |
| “Body Invaders” | **larvae, surrogate womb, invaded, cocoon, parasitized, body guard**    The caterpillar is **invaded** by parasitic wasp larvae.  Once infected with wasp **larvae**, the larvae will grow inside the caterpillar.  The caterpillar acts as a **surrogate womb** for the wasp larvae to grow. With the larvae feasting on the caterpillars blood.  When ready, the larvae will use their teeth to break out of the caterpillar. The caterpillar spins a **cocoon** around the larvae to protect them from other parasites.  The caterpillar acts as a **bodyguard** and protects the **cocoon** from predators.  The **parasitized** caterpillar then dies from starvation. |
| “Snail Zombies” | **incubating, ingesting, reprogrammed, cycle, defecation, parasite**  Worms use a snail’s body to **incubate** their larvae.  The parasite **reprograms** the snail’s brain to crawl out in the open where birds will see the now colorful eyestalks of the snail.  Birds can’t resist the brightly colored snail and **ingests** the snail.  After the bird eats the snail it **defecates** the parasite out.  The **cycle** repeats itself again when the snail eats the bird poop.  What is ironic is that snails infested with this **parasite** often live longer than snail that aren’t infected. |
| “Paratasized Ants Get Berry Sick” | **parasitized, nematode, abdomen, mimicry, droppings, specimens**  When an animal is **parasitized** it means that it has been infected by a parasite.  A **nematode** is a type of parasite that uses ants as its host.  The nematode’s eggs make the ant’s **abdomen** swell up and turn red to look like a berry.  The discovery of the nematode making an ant’s abdomen look like a berry is the first known case of a parasite causing fruit **mimicry** in its host.  After the birds eat the ants, their **droppings** fall to the forest floor where other ants go through it to get seeds, but they end up picking up more nematodes too.  Scientists know about the nematode and the parasitized ants because they studied **specimens** of infected ants. |
| “Biography of Judy Sakanari” | **parasite, host, dependent, parasitologist, mutually beneficial, marine animals**  A **parasite** is an animal that lives on or inside another animal.  A **host** is the animal the parasite lives in or on.  Parasites are **dependent** on their hosts in order to get food and to survive.  A **parasitlogist** is a scientist who studies parasites and their relationships with their hosts.  When the relationship is helpful to the parasite and the host it is known as being **mutually beneficial**.  Judy Sakanari studies parasites that live on **marine animals**, or animals that live in the water, such as fish and seals. |
| “Parasite Tales: The Jewel Wasp's Zombie Slave” | **Jewel Wasp, burrow, larvae, pupa, River Blindness, Nervous System**  The **Jewel Wasp** makes its house inside the body of a cockroach.  It makes a **burrow** inside the ground.  The wasp lays an egg and out comes a wasp **larvae**.  The larvae grows into a **pupa** or cocoon.  Scientists use the drug Ivermectin to paralyze parasitic worms to cure **River Blindness**.  The wasp stings the cockroach and attacks its **Nervous System** which paralyzes the cockroach. |
| Sensational Six | **parasite, host, dependent, manipulated, command, reproduce** |
| Summary:  A **parasite** invades the bodies of other living things. Once a parasite invades another living thing, its body becomes the parasite’s **host**. The host is **manipulated** to do whatever the parasite **commands**. The parasite **depends** on the host for survival and its ability to **reproduce**. | |

**Learning Worth Remembering**

**Singular Activities** – the following activities can be assigned for each resource in the set. The purpose of these activities is to check for understanding, capture knowledge gained, and provide variety of ways for students to interact with each individual resource. Students may complete some or none of the suggested singular activities for each text. Singular activities should be assigned at the discretion of the teacher.

1. **A Picture of Knowledge** (Recommended for *Zombie Makers: True Stories of Nature’s Undead* Introduction; “One of Most Complicated Lifecycles: Extreme Parasite Controlling the Ant’s Brain” video; “Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master?” article and slideshow; *The Life Cycle of the Guinea Worm Disease* infographic; *Body Invaders* video)

* Take a piece of paper and fold it two times: once across and once top to bottom so that it is divided into 4 quadrants.
* Draw these shapes in the corner of each quadrant.

1. Square
2. Triangle
3. Circle
4. Question Mark

**?**

* Write!

Square: What one thing did you read that was interesting to you?

Triangle: What one thing did you read that taught you something new?

Circle: What did you read that made you want to learn more?

Question Mark: What is still confusing to you? What do you still wonder about?

* Find at least one classmate who has read [selection] and talk to each other about what you put in each quadrant.

1. **Quiz Maker** (Recommended for no texts in this set) Omit?

Make a list of # questions that would make sure another student understood the information.

* Your classmates should be able to find the answer to the question from the resource.
* Include answers for each question.
* Include the where you can find the answer in the resource.

|  |  |
| --- | --- |
| **Question** | **Answer** |
| 1. |  |
| 2. |  |
| 3. |  |

1. **Wonderings** (Recommended for  **“**ZomBee Infection Map”)

On the left, track things you don’t understand from the article as you read.

On the right side, list some things you still wonder (or wonder now) about this *topic.*

|  |  |
| --- | --- |
| I’m a little confused about: | This made me wonder: |
|  |  |

1. **The Survival of a Parasite Graphic Organizer** (Recommended for “’Zombie’ Bees Surface in the Northeast” video; “Fungus Creates Zombie Ant Army to Reproduce” article; “Guinea Worm Eradication Program” webpage; “Parasite Tales: The Jewel Wasp's Zombie Slave” video and others, if students are interested.)
2. Read or view each selection in the set, one at a time.
3. After you read or view *each* resource, stop and think what you learned about parasites and how they survive. What is the name of the parasite you learned about? Who does it choose for a host or hosts? How does/do the host(s) help the parasite survive?
4. Then write, draw, or list how this new information added to what you learned from the last resource(s).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Title** | **Parasite name** | **Who does it choose as a host or hosts?** | **How does/do the host(s) help the parasite survive?** | **How does this information add to what I’ve learned already?** |
| 1. “‘Zombie’ Bees Surface in the Northeast” | Apocephalus borealis fly | European honeybees, bumblebees, and yellow jacket hornets | Flies latch onto honeybees and lay eggs in the bee. The bees act in “zombie” like ways once they become infected with the fly’s eggs. The bees die after the eggs hatch. | Why do parasitic insects need a host? |
| 1. “Fungus Creates Zombie Ant Army to Reproduce” | Parasitic fungus : Ophiocordyceps unliateralis | Ants | After being infected by spores released by the fungus, the ant dies in an exposed position, typically clinging onto shrub leaves. The fungus then grows out of the head of the ant, releasing spores into the air. These spores rain down onto other ants. The cycle continues. | Fungus must behave in clever ways and use other insects so they may reproduce. |
| 1. “Guinea Worm Eradication Program” | Dracunculus | Humans | Humans infected with the worm seek relief from the pain and immerse their limbs in the water. The worm bursts and releases larvae into the water. Other humans drink the water and ingest the larvae. A worm grows inside the human. These humans also seek relief and the life cycle begins again. | There is no known curative medicine or vaccine to prevent this disease. Parasitic infections can be stopped through community-based interventions that educate and change behavior. |
| 1. “Body Invaders” | Cotesia Glomerata wasp | Caterpillars | Wasp injects eggs into caterpillar. The caterpillar acts as a surrogate womb. When eggs hatch the larvae chew their way out of caterpillar and then get the caterpillar to make a protective cocoon around the larvae. The caterpillar then acts as a bodyguard until pupae are ready to hatch out of the cocoon. | Parasites have to behave in clever ways and use other insects and animals so they may reproduce. |
| 1. “Snail Zombies” | Leucochloridium worm | Snails and birds | A parasitized snail get birds to eat the snail’s eyestalks (because they look like caterpillars). Once inside the bird, the parasite grows in the birds guts and then is defecated out of the bird. Then another snail eats bird poop and starts cycle again. | Has to do with the food cycle and animals getting the energy they need to reproduce. |
| 1. “Paratasized Ants Get Berry Sick” | Nematode | Ants | The nematode makes ants’ abdomens look like red berries so that birds will want to eat them. After the birds eat and digest the ants, they poop. The ants go through the bird poop to gather seeds to feed ant larvae. The poop is infected with nematodes too, so the ants actually feed nematodes to the larvae and the process starts all over again. | This is another parasite that depends on more than one host to survive. |
| 1. “Parasite Tales: The Jewel Wasp's Zombie Slave” | The Jewel Wasp | Cockroach | The Jewel Wasp bites on the cockroach’s wing and quickly stings it twice paralyzing the cockroach. The wasp digs a burrow and drags the cockroach inside. It lays an egg and out comes a larva. It chews a hole into the cockroach’s body and crawls inside. It grows inside and about a month later the wasp leaves the cockroach’s dying body and goes on in search of another cockroach to begin the cycle again. | This information gives another example of a parasite-host relationship. It also goes on to discuss how the behavior of the Jewel Wasp and the science behind the sting relates to Pharmacology. |

1. **Parasite Features Analysis** (Recommended for “‘Zombie’ Bees Surface in the Northeast” video; “Fungus Creates Zombie Ant Army to Reproduce” article; “Guinea Worm Eradication Program” webpage; “Parasite Tales: The Jewel Wasp's Zombie Slave” video and others, if students are interested.)

Semantic Feature Analysis can help you explore how a set of things are related to one another. By analyzing the grid you'll be able to see connections, make predictions and master important concepts. You'll also realize things that you don't know yet, so you'll know what additional research you need to do.

1. Put a + or- in each box according to the features each parasite exhibits.
2. Once your feature analysis is done at the end of the Text Set study, look at it closely. Observe! What patterns emerge? Summarize your ideas in the “Summary” chart below to record what you notice and what you’re still wondering.

**FEATURES OF A PARASITE**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| The Parasite... | ...makes the host look like some-  thing it is not | ...causes the host to act strange | ...causes the host to obey | ...causes the host to act as bodyguard | ...causes the host to be tricked into spreading the parasite to infect others | ...uses the host as a surrogate mother | ...is ingested by host | ...injects host to gain access | other |
| Zombie Fly |  | + |  |  |  |  |  | + |  |
| Guinea Worm |  | + |  |  | + |  | + |  |  |
| Fungus |  | + | + |  | + |  |  |  |  |
| Snail Worm | + | + | + |  | + | + | + |  |  |
| Nematode Worm | + |  |  |  | + |  | + |  |  |
| Protozoa |  |  |  |  |  |  |  |  |  |
| Caterpillar Wasp |  | + | + | + |  | + |  | + |  |
| Jewel Wasp |  |  |  |  |  |  |  | + |  |
| Other |  |  |  |  |  |  |  |  |  |

**Summary**

|  |
| --- |
| I noticed...  *I noticed that the parasites that attack the caterpillar and the snail use the host as a place to carry their babies. But the parasitic worm is eaten by the host and the wasp injects itself into the host.* |
| I’m still wondering…  *I wonder how parasites learn which way is best to infect a host?* |

**6. Fact or Fib Game** (Recommended for “Snail Zombies” video)

1. Based on the information you have gathered about parasites in your Rolling Knowledge Journal and your Rolling Vocabulary Journal, come up with a fact or a fib about parasites and/or zombies.
2. Write your fact or fib in the box labeled “Fact or Fib?”
3. Put your fact and/or fib in the class “Fact or Fib?” box so it can be used for a class game at the end of this Text Set. (Work with a partner to share your fact or fib and ask them to determine if it’s a fact or a fib.)
4. In the “Check One” box, indicate whether your information is a fact or a fib.
5. In the “Source” box, record your source. If it’s a fact, record the text or video where you found this information. If it’s a fib, record the text or video that you used to help you come up with the fib.

|  |  |
| --- | --- |
| Student Name | |
| Fact or Fib? | |
| Check one   * This is a fact * This is a fib | Source  Title:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Page number or video time stamp:\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**7. Pop Quiz** (Recommended for *Parasites: Organisms that feed on living things*; “Biography of Judy Sakanari”)

Answer the following questions about *Parasites: Organisms that Feed on Living Things.*

|  |  |
| --- | --- |
| **Question** | **Possible Answer** |
| 1. What is a host? | The organism that a parasite lives in or on. |
| 1. Can a plant be a parasite? | Yes. |
| 1. Where does the word parasite come from? | An Ancient Greek work referring to a person looking for a free meal. |
| 1. How do people get the Giardia parasite? | By drinking infected water. |
| 1. What is a vector? | An organism that passes on parasites. |
| 1. What are two things people can do to avoid parasites? | Practice good hygiene and avoid drinking contaminated water. |
| 1. Do all kinds of parasites kill their hosts? | No. |
| 1. What is an Endoparasite? | A parasite that lives inside the body. |

Read the information below and answer the following questions about “Biography of Judy Sakanari.”

Based on “Biography of Judy Sakanari” and the parasitologist section page 19 of *Parasites*,consider what it might mean to understand parasites the way a parasitologist understands parasites. Also think about all of the facts and information you learned about parasites and hosts throughout this study. Use all of this knowledge to answer the following questions:

|  |  |
| --- | --- |
| **Question** | **Possible Answer** |
| 1. What type of information do parasitologists gather about the organisms they study? | Parasitologists study the life cycle of parasites. They learn about the animals they choose for hosts and how the hosts are affected by the parasites that live in or on them. They have discovered that parasites live all over the world and some parasites turn their hosts into zombies. They have also learned that some parasites make their hosts sick or even make them die. |
| 1. Why might they gather this type of information? | Some parasitologists, like Judy Sakanari, are just fascinated by parasites. Some parasitologists are trying to learn about cures for infestations or how to make new medicines. |
| 1. Review all of the information you have gathered in your Rolling Knowledge Journal and your Rolling Vocabulary Journal. Write three important pieces of information that you think other people should know about parasites. | * Many parasites live in or on more than one host throughout their life cycle. * Some parasites take control of their hosts’ minds and make them into zombies. * Zombified hosts do unusual things, such as the caterpillar who acts like a babysitter to the wasps when they’re in their cocoons. * Parasites live all over the world on land, in trees and in water. |
| 1. Think like a parasitologist. You’ve learned a lot about parasites, but scientist are always studying and learning new things. What are you still wondering about parasites? | * Are there any parasites that are helpful to their hosts? * What are some other parasites that choose humans as hosts? * What kinds of parasites or zombies might live in my backyard? |

**Expert Pack:** Real Zombies in Real Life?!

Submitted by: Providence Public Schools

Grades: 5-6 Date: May 2015

Expert Pack Glossary

***Zombie Makers: True Stories of Nature’s Undead***

|  |  |
| --- | --- |
| *Word* | *Student-Friendly Definition* |
| Fungu | Fungi are everywhere. Mushrooms are fungi and you have eaten bread, made with yeast, another fungus. Old bread may grow mold which is another type of fungus. |
| Hosts | A living plant or animal that has a parasite living in or on it. Imagine you’re the host of a party or gathering with an uninvited guest! |
| Parasite | Parasites invade the bodies of other living things. Every organism, including you, is a pretty enticing (inviting?)environment to a lot of parasites. Mites, lice, fleas, ticks and tapeworms — most living creatures that have a habitat also **are** a habitat, including humans. |
| Reproduce | If you are an organism, you will need to reproduce. Otherwise, there will be no more of your species and the species will die off. |
| Spores | A spore is like a tiny seed. Spores are tiny specks of fungi that shoot into the air when ripe and infect other living things. |
| Zombie | Zombies are **fictional** undead creatures whose minds are gone and bodies are decomposing. |

**“One of Most Complicated Lifecycles: Extreme Parasite Controlling the Ant’s Brain”**

|  |  |
| --- | --- |
| *Word* | *Student-Friendly Definition* |
| Digestive System | The part of the human body with the salivary glands, liver, pancreas, other organs of digestion. |
| Lodged (Lodging?) | A house used as a temporary residence. |
| Mucus | A slippery and somewhat stickyfluid secreted by theglands. |
| Paralyzed | To bring to a condition of helpless inactivity, or inability to act. |

***Parasites: Organisms that Feed on Living Things***

|  |  |
| --- | --- |
| *Word* | *Student-Friendly Definition* |
| Arachnids | Class of air-breathing animals with four pairs of legs. |
| Biomes | Large areas with the same climate and other natural conditions in which certain kinds of plants and animals live and grow. |
| Cell | The smallest unit that all living things are made of. |
| Consumers | Animals that feed on plants or other animals. |
| Energy | The usable power living things receive from food that they use to grow, move and stay healthy. |
| Fungus | Living thing that makes small cells that reproduce instead of seeds. |
| Host | An organism that feeds and houses a parasite. |
| Intestines | Lower part of the Digestive System that food enters after it leaves the stomach. |
| Larvae | Worm-like babies of insects and some other types of living things. |
| Microscope | Tool used to view tiny organisms. |
| Nematodes | Certain kinds of worms with bodies that have no segments. |
| Nutrients | Substances that provide food for plants and animals. |
| Organ | A part of the body that carries out specific functions. |
| Predators | Animals that hunt other animals for food. |
| Producers | Living things, such as plants, that produce their own food. |
| Protozoa | Single-celled organisms that can have both plant and animal characteristics. |
| Species | A group of the same kind of living things, members can breed together. |
| Spores | Small cells that reproduce; used instead of seeds to make new fungi. |
| Tropical | Areas that have a very warm climate year-round. |
| Vectors | Carriers, such as ticks or flies that transmit parasites from one organism to another. |
| Vein | Tube that carries blood toward the heart. |
| Venom | Fluid from an animal that acts as a poison. |
| Viruses | Tiny organisms that can cause disease. |

**Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master?**

|  |  |
| --- | --- |
| *Word* | *Student-Friendly Definition* |
| Abdomen | The stomach or belly of a human or animal. |
| Cocoon | A silky case spun by the larvae of insects for protection in the pupal stage. |
| Evolutionary | Having to do with change over a period of time. |
| Manipulation | Being controlled by something. |
| Possessed | To be controlled by something else. |
| Tentacle | A slender flexible limb in an animal. |

**Zombie Creatures: What Happens When Animals Are Possessed by a Parasitic Puppet Master? [Slideshow]**

|  |  |
| --- | --- |
| *Word* | *Student-Friendly Definition* |
| Chemical | A compound or substance that has been purified or prepared. |
| Metabolized | When a substance is processed by a living thing. |
| Tainted | Contaminated or polluted. |

**‘Zombie’ Bees Surface in the Northeast**

|  |  |
| --- | --- |
| *Word* | *Student-Friendly Definition* |
| Agriculture | Science and work of raising crops and farm animals. |
| Agricultural Production Specialist | Someone who is an expert in raising crops or animals. |
| Amateur | One who does something only for enjoyment rather than for money. |
| Colleagues | A person who has the same job as another. |
| Confirmed | To prove or show to be true. |
| Continent | One of earth’s seven major land areas. |
| Culprit | A person who is charged with or guilty of doing something wrong. |
| Disoriented (verb)  disorient, disorientation | To cause to lose one’s sense of direction. |
| Erratic (adjective)  erratically | Not expected or predicted, not regular. |
| Exhibiting | To show or display. |
| Ghoul (noun) | An evil spirit that is believed to eat people and dead bodies. |
| Havoc (noun) | Ruin or devastation. |
| Hosts | A plant or animal that has a parasite living on or in it. |
| Infest (verb) | To spread in or overrun as a nuisance or danger. (invade, overrun) |
| Iteration | To say or do again, repeatedly. |
| Mutant (noun)  mutant, mutation | A life form whose genes are different from its parents. A mutant has new characteristics that can be passed to its offspring. |
| Parasites  parasitize | A plant, animal, fungus that lives on or in another living thing, called the host. |
| Posed | To take or hold a position. |
| Reminiscent (adjective) | Have qualities that remind one of something or someone. |
| Verified (verb)  verifiable, verify | To make sure of the truth or correctness. |

**Fungus Creates Zombie Ant Army to Reproduce**

|  |  |
| --- | --- |
| *Word* | *Student-Friendly Definition* |
| Alters | Alter means to change something. This article talks about how fungus alters the behavior of the ant, causing it to die. |
| Fungus | Fungi are everywhere. Mushrooms are fungi and you have eaten bread, made with yeast, another fungus. Old bread may grow mold which is another type of fungus. |
| Invasive | Invasive means to spread undesirably or harmfully. It is especially of plants or a disease. |
| Reproduce | If you are an organism, you will need to reproduce. Otherwise, there will be no more of your species and the species will die off. |
| Species | Species is a group of the same kind of living things. Members can breed together. |
| Spores | Spores are small cells that reproduce; used instead of seeds to make new fungi. |

**Guinea Worm Eradication Program**

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| *Word* | *Student-Friendly Definition* |
| Carter Center | The Carter Center is an organization that has led the international campaign to eradicate Guinea Worm Disease. They are wiping out the disease through community-based interventions to educate and change behavior. This organization works in South Sudan, Mali, Chad and Ethiopia. |
| Eradicate | Eradicate means to destroy completely. Organizations are working to eradicate the Guinea Worm Disease. |
| Guinea Worm Disease | Guinea Worm Disease is an infection caused by the nematode roundworm parasite. It is contracted when people drink water from stagnant sources contaminated with the Guinea Worm larvae. It affects people in Asia and Africa. |
| Incapacitate | Incapacitate means to prevent from functioning in a normal way. |
| Incubation | Incubation is the period where organisms stay warm until they hatch or are born. |
| Nematode | Nematodes are certain kinds of worms with bodies that have no segments. |
| Parasitic disease | Parasitic disease is an infectious disease caused or transmitted by a parasite. Parasitic diseases can affect practically all living plants and animals. |
| Secondary bacterial infections | Secondary bacterial infection is an infection that occurs in individuals that have already been diagnosed with another infection. Patients with Guinea Worm Disease tend to develop these types of infections where the worm comes out. |

**The Life Cycle of the Guinea Worm Disease**

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| *Word* | *Student-Friendly Definition* |
| Digestion | Digestion is the process by which food is changed to a simpler form after it is eaten. |
| Guinea Worm Disease | Guinea Worm Disease is an infection caused by the nematode roundworm parasite. It is contracted when people drink water from stagnant sources contaminated with the Guinea Worm larvae. It affects people in Asia and Africa. |
| Incubation | Incubation is the period where organisms stay warm until they hatch or are born. |
| Larvae | A larva is the active immature form of an insect. Larvae do not have wings and look like worms. Most kinds of insects spend part of their lives as larvae. Caterpillars are a type of larva. |
| Life cycle | Life cycle is the series of changes in the life of an organism, including reproduction. |
| Limbs | Limbs are arms and legs of a person or a four-legged animal. |
| Resist | Resist means to fight against. The larvae fight against being digested. |
| Water fleas | Water fleas are small crustaceans that live in water. They eatthe larvae which are then digested by humans. |

**Body Invaders**

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| *Word* | *Student-Friendly Definition* |
| Aggression | Any mean or unfriendly act against another. |
| Barrier | Anything that gets in the way of action or progress. |
| Bizarre (adjective) | Strikingly odd or unusual, especially in appearance or behavior. |
| Cocoon (noun) | A covering made by young insects and some other arthropods to protect themselves while they change from a pupa into an adult. Some spiders make cocoons to hide their eggs. |
| Corruption | Poison. |
| Environment(noun) | The things and conditions that are all around one. |
| Host (noun) | A plant or animal that has a parasite living on or in it. |
| Impregnated | To make (a female animal or human) pregnant, or to make (an egg) fertile. |
| Incredibly  incredible | Difficult or impossible to believe. |
| Invade | To enter as an enemy, by force, in order to conquer. |
| Ironic  irony | Contrast that is usually interesting or surprising between what one would normally expect and what the real thing or situation is. |
| Jagged (adjective) | Having points that are sharp and uneven. |
| Larvae (noun)  larva | An insect after it hatches from an egg and before it changes into its adult form. Larvae do not have wings and look like worms. Most kinds of insects spend part of their lives as larvae. Caterpillars are a type of larva. |
| Obese (adjective) | Very fat. |
| Paralyze (verb) | To take away the ability to move or feel in a part or parts of the body. |
| Parasitized  parasite | A plant, animal, fungus that lives on or in another living thing, called the  host. |
| Profoundly (adjective) | Coming from or going to a great depth. |
| Surrogate | One that acts in another's place, esp. in an official capacity; substitute. |
| Transformation (noun) | A major change in the form, shape, character, or nature of something or someone. |
| Truce (noun) | A stop or end of war that is agreed upon by all groups that participate. |
| Unceasingly | Without pause or respite; continuous. |
| Vital  Organs (noun) | Having to do with life. A part of plants or animals that performs a particular task. The heart, the lungs, the skin and the eyes are all organs of animals. |
| Womb | A place of generation and development. |
| Wound (noun)  wounded | A cut or other injury to a part of the body. |

**Snail Zombies**

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| *Word* | *Student-Friendly Definition* |
| Amber | A yellowish brown color. |
| Bizarre | Strikingly odd or unusual, especially in appearance or behavior. |
| Cycle | A circle of events that repeats in a regular pattern. |
| Defecation | To expel feces from the bowels. |
| Eliminate | Get rid of. |
| Eye stalk | ?? How about: A moveable tube that has an eye ball at the end of it. Lobsters and shrimps also have eye stalks. |
| Haven | A place of safety, shelter or comfort. |
| Incubating | To keep warm until time to hatch. |
| Infected | To spread germs or disease to. |
| Ingesting | To take in to the body through the mouth. |
| Larvae | An insect after it hatches from an egg and before it changes into its adult form. Larvae do not have wings and look like worms. Most kinds of insects spend part of their lives as larvae. Caterpillars are a type of larvae. |
| Nefarious | Very wicked, or evil. |
| Parasites | A plant, animal, fungus that lives on or in another living thing, called the  host. |
| Pulsating | To vibrate; tremble; quiver. |
| Reprogrammed | A plan or schedule that repeats. |
| Vividly  vivid | Bright and strong. |

**Paratasized Ants Get Berry Sick**

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| *Word* | *Student-Friendly Definition* |
| Larvae | A very young form of an insect that looks like a worm. |
| Manipulate | To deal with or control (someone or something) in a clever and usually unfair or selfish way. |
| Organisms | An individual living thing. |
| Sophisticated | Highly developed and complex. |

**Biography of Judy Sakanari**

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| *Word* | *Student-Friendly Definition* |
| Digestion | The process by which food is changed to a simpler form after it is eaten. |

**Parasite Tales: The Jewel Wasp's Zombie Slave**

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| *Word* | *Student-Friendly Definition* |
| Burrow | A hole or tunnel in the ground. |
| Ivermectin | A drug that acts just like the behavior of the Jewel Wasp to the cockroach. It is used to paralyze parasitic worms that cure River Blindness. |
| Larva | The newly hatched, wingless, often wormlike form of many insects before metamorphosis. |
| Nervous System | The system of nerves and nerve centers in an animal or human, including the brain and spinal cord. |
| Pupa | The form of an organism inside of a cocoon. |
| River Blindness | A disease caused by a worm-like parasite. |
| The Jewel Wasp | An insect from Africa and Asia who makes its house inside a living cockroach. |